

Examining the Association Between Hurricane and Crime Engagement in Louisiana

Alexandra Adetutu Oseni

Southern University and A & M College, Department of Public Policy, Baton Rouge, Louisiana

Abstract

Natural disasters have become a lot more widespread in the United States of America, whereby a lot more attention is warranted toward the resulting social ills and the subsequent crime rates, a degree that has spawned an overabundance of studies, including this particular publication. Meanwhile, the effects that natural disasters usually have on an economy are not very well understood by society. Instead, it is generally assumed that economic growth, and businesses, for example, declines shortly after the occurrence of a particular disaster, while crime slowly increases to pre-disaster and post-disaster levels over time. The study used secondary sources of data between the years of 1995 and 2015 from the Federal Emergency Management Agency (FEMA), The U.S. Department of Housing and Urban Development (HUD) and the Federal Bureau of Investigation's - Uniform Crime Reports (UCR). Following the ravaged caused by Hurricane Katrina in 2005 and in an attempt to prevent a similar occurrence in New Orleans, Baton Rouge, and Lafayette, in the future, this study tends to examine the association between hurricane disasters and crime in general. The analysis of the crime data in the midst of Hurricanes from 1995 to 2015 has underscored that there is a high association between Hurricanes (i.e. natural disaster) and crime in general. This may be attributed to insufficient adequate preparedness towards natural disaster. Above all, the study recommends that the State of Louisiana should come out with a comprehensive urban design for restoring Louisiana from flood or Hurricane disasters. Such a comprehensive crime defensive urban design must incorporate a workable public policy for the benefit and satisfaction of the people as well as to ensure care for the environment.

Keywords: Hurricane, Disasters, Storm, Crime, and Growth

DOI: 10.7176/JLPG/87-04

Publication date: July 31st 2019

Introduction

Crime rate is one of the criminal justice indexes of development used at the global level. In fact, natural disasters have become a lot more widespread in the United States of America, whereby a lot more attention is warranted toward the resulting social ills and the subsequent crime rates, a degree that has spawned an overabundance of studies, including this particular publication. Meanwhile, the effects that natural disasters usually have on an economy are not very well understood by society. Instead, it is generally assumed that economic growth, and businesses, for example, declines shortly after the occurrence of a particular disaster, while crime slowly increases to pre-disaster and post-disaster levels over time (Leitner and Helbich, 2011; Liu, 2008).

In the last three decades, it was clearly observed that many developing countries, especially those in Asia, have increasingly been impacted with aggregated disaster events, which have unfortunately caused a drop in their overall development, especially in the area of such a natural disaster as floods. Nevertheless, many developed nations are known to have been impacted by just single events in their disaster-prone as well as increasingly exposed and vulnerable urban areas, indeed such as it was experienced with the 2005 Hurricane Katrina; 2018 Hurricane Barry in the United States (i.e. Louisiana), and also the 2011 Japanese earthquake, both of which caused immense monetary damages (Kofi Anan, 2002; Leitner and Helbich, 2011; Liu, 2008). Also, Liu (2008) attributed the rampant crime rate after particular disasters to lack of effective urban planning in view of the living conditions of the affected individuals. As confirmed by the United Nations' agency, there is the evidence that poorly planned and managed urban development problems have gone a long way to generate new hazards as well as what United Nations experts have considered to be extensive risks (UNISDR, 2013).

According to the United Nations International Strategy for Disaster Reduction Secretariat, (UNISDR) as disaster is defined as a serious disturbance of the performance of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources, (UNISDR, 2009). The UN agency further explained that the effects of the natural disaster may perhaps include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption and environmental degradation (UNISDR, 2009).

Furthermore, Dille et al. (2005) argued among other details, that such discrete natural exposures as earthquakes, volcanoes, landslides, floods, drought, and cyclones, have often produced severe global impacts on a variety of communities around the world, including Baton Rouge, New Orleans, and Lafayette. Above all, earthquakes as well as floods, drought, and many other natural disasters are known to have caused tens of

thousands of deaths, hundreds of thousands of injuries, and billions of dollars in economic losses each year around the world; and in the awoken of that is an ever-growing number of crimes, thereby making disaster and crime critical issues of regional (Louisiana, Texas, e.t.c.), national (United State of America), global concern (see Table 1 for more details).

Table 1: Summary of United State of America Periodic Natural Disasters from 2005 to 2018

Natural Disasters	Historical Dates
Hurricane Katrina	(2005)
Wildfires of California	(2007)
Super tornadoes in Tennessee, Arkansas, Kentucky, Alabama and Illinois	(2008)
Earthquake and tsunami in American Samoa	(2009)
Flood in Arkansas	(2010)
Flood in Mississippi River Valley	(2011)
Hurricane Sandy in Eastern U.S.	(2012)
Flood in Colorado	(2013)
Wildfire in Arizona	(2014)
Flood in Texas, Oklahoma, and Kansas	(2015)
Flood in Louisiana	(2016)
Hurricane Harvey in Texas and Louisiana	(2017)
Hurricane Barry	(2018)

Source: (Federal Emergency Management Agency, 2018)

In addition to the sequential occurrence of the natural disaster across the United States of America, the Federal Emergency Management Agency, further reported that between 2007 and 2017, mainland United States of America have recorded a total number of 1,222 natural disasters (FEMA, 2017). Currently, in June 2018 Louisiana suffered from Hurricane Barry. Also, over the past decade, a number of significant disasters have, as well, impacted inner mainland of the United States as well as its constituent territories. Similar to what crime does, the prevailing FEMAS reports have further asserted that some of the natural disasters have resulted in numerous deaths and billions in property damages, and violence crime (FEMA, 2017). Also, FEMA (2017) reported that the 2005 mass devastation resulted from Hurricane-Katrina, from which many residents either perished or never recovered. An understanding of the disaster, which occurred in New Orleans and other part of Louisiana, was very critical to this particular publication because not less than 3,000 individuals lost their lives and nearly 800,000 homes were destroyed or damaged, according to governmental sources (FEMA, 2017). In an attempt to prevent a similar occurrence in New Orleans, Baton Rouge, and Lafayette in the future, this study tends to examine the association between hurricane disasters and crime in general.

The Historical Trend of Hurricanes Literature Review

The historical views and trend of United States of America disastrous storms and disparaging weather systems were categorized and also catalogued at the time, but the actual naming of U.S. hurricanes and tropical storms did not begin until the year 1953. As it is commonly understood, scholars have documented that hurricane intensity is usually measured by the Saffir-Simpson scale, which uses wind speed, storm surge, and barometric pressure to assign a category number (mainly between a scale of 1-5), and it is this scale that often predicts the scope and nature of hurricanes as well as their impact on such coastal cities as New Orleans, and many others (Zebrowski, 2005). This current study has discussed the six (6) most destructive storms of the twenty-first (21st) century, namely: the Hurricane of 1947 as well as Hurricanes Betsy, Camille, and Georges (Yamazaki, 2002) as well as Hurricane Katrina in 2005. For accuracy and clarity, the following enumerated detailed descriptions, as quoted below, provide very useful information to explain the categorization:

[A] About the 1947 Hurricane-Storm (George): The Hurricane of 1947 made landfall near the Chandeleur Islands of Louisiana on September 19th. Wind gusts of 112 miles per hour and a central pressure of 967 millibars (mb) were measured at what is now New Orleans International Airport, which was less than 2 meters (6.5 feet) of water. A storm surge of 3 meters (9.8 ft.) reached the bayou village of Shell Beach, which is a 40-minute drive southeast of the city (Yamazaki, 2002). It's significant to note that old Shell Beach now lies beneath five feet of water due to wetlands loss caused by the Mississippi Gulf River Outlet, which was constructed in 1968 (Bourne). The 1947 Hurricane claimed 51 lives, flooded Jefferson Parish to a depth of 1 meter (3.28 ft), and caused 100 million dollars of damage in New Orleans.

[B] About the 1965 Hurricane – Storm (Betsy): Hurricane Betsy made landfall on September 10th, 1965 at Grand Isle, Louisiana with a pressure of 948 mb, gusts of 160 miles per hour (mph), and a forward speed of 22 mph. The island was completely flooded by the 4.8 m (15.7 ft) storm surge. Offshore oil rigs, public utilities, and commercial boats all suffered severe damage. Eighty-one people died, and damage in southeast Louisiana totaled \$1.4 billion. The greatest lesson of Hurricane – Storm (Betsy) was that a lot of lives and properties were

loss due to improper functioning of the pumping machine (the worst flooding in decades).

[C] About the 1969 Hurricane - Storm (Camille): The most significant storm for Mississippi and Louisiana during the 20th century was Hurricane Camille, which struck the Mississippi coast on August 17th, 1969 with a small diameter and a forward speed of 14 mph,” (Yamazaki, 2002). Camille was one of only three storms to hit the U.S. mainland that was rated as a Category 5 during the 20th century, which was rivaled by Florida’s Labor Day Hurricane in 1992. The pressure was 901 millibars and the winds were estimated at 175 mph before later data gave a wind speed of 201 mph, making it the only 20th century storm to satisfy all of the Category 5 criteria at landfall, and it is the catalyst for the development of the Saffir-Simpson scale (Yamazaki, 2002). According to the records, above-described storm caused massive flooding and landslides, particularly in the Appalachians, as it curved through Tennessee, Kentucky, and the Virginias. Property damage exceeded 11 billion dollars, but \$350 million in Louisiana alone. That is in spite of the fact that the storm, as recorded by scholars, was known to have turned north in time to miss New Orleans itself (Yamazaki, 2002). Also, despite the huge amount of damage caused by Camille, it could have been much worse for Louisiana, especially in Plaquemines Parish (Zebrowski, 2005). Very importantly, some of the forecasting and communication errors, which were made during 1957’s Hurricane Audrey, were corrected before Camille’s Category 5 hurricane hit the area. Without the correction, several hundred thousand people would have been trapped for the death toll to have reached tens of thousands, according to scholars and experts in their reports (Zebrowski, 2005).

[D] About the 1998 Hurricane – Storm [Georges]: Two crucial and very recent storms worthy of being mentioned before Hurricane Katrina were Hurricanes Georges and Ivan, both of which exposed the vulnerabilities of New Orleans, and the other cities in Louisiana. In 1998, Georges inflicted extensive damage on numerous Caribbean islands before making landfall near Biloxi in the State of, Mississippi on September 28, 1998, indeed with a maximum sustained surface wind of 104 mph and a central pressure of 964 mb. A total of four hundred sixty (460) people died; however, none of these people were in Louisiana. As professionals estimated, the flooding for Hurricane Georges was actually a full category higher than its category 2-3 intensity on the Saffir-Simpson scale because it was such a slow-moving storm. The hurricane, upon actually shifting to the east, helped in missing the city of New Orleans, but the evacuation raised major concerns. Theft and vandalism occurred when approximately 14,000 people poured into the Superdome, the sporting arena that was functioning as a shelter.

[E] The 2004 Hurricane – Storm [Ivan]: Hurricane Ivan exposed major evacuation issues as more than one million people tried to leave the greater New Orleans area on one day, thus Tuesday September 14, 2004, thereby creating a traffic jam worse than the traffic problems caused when people evacuated for Georges. The state police enacted contraflow traffic patterns in the afternoon, but the 60 miles of distance between New Orleans and the state capital of Baton Rouge was a seven-hour traveling ordeal, as recorded by Barbara McCarragher, a hurricane-related historian, who has recorded such events.

[F] The 2005 Hurricane-Storm [Katrina]: Hurricane Katrina – with its vast devastation in material and human costs --may be the most memorable storm in New Orleans history. The State of Louisiana was hit by 49 of the 273 hurricanes that made landfall on the American Atlantic Coast between 1851 and 2004; additionally, 18 of the 92 major hurricanes, with Saffir-Simpson ratings of category 3 or above, have struck the state (U.S. Mainland Hurricane Strikes by State, 2004; King, 2006). According to Fitzpatrick (1999), hurricanes have been an integral part of Louisiana’s history. An expert has documented, for example, that a storm surge from a stalling hurricane or tropical storm system can easily reach 30 feet (Fitzpatrick, 1999). In fact, according to available records, they have had an average of nearly three claims per property for a total of \$308 million, according to a report of New Orleans hurricane risk factors. Some people have described Hurricane Katrina as the most anticipated and also most costly natural disaster in modern United States history. In fact, even before the storm hit the city, the Federal Emergency Management Agency (FEMA) had already listed a hurricane strike in New Orleans as one of the most probably threats to any part of the nation, which was rated to be on par with a large California earthquake or a terrorist attack on New York City, according to online sources (Fitzpatrick, 1999).

Figure 4.1 shows the number of storms associated with hurricane incidences and their prevalence between 1995 and 2015. Theoretically, it was underscored that the period with a high incidence of storms, which were associated with hurricanes occurrences, experienced high devastating cases. With respect to the number of hurricane-storms, figure 4.1 compares the incidence of storms before and after Hurricane Katrina. The median number is a key factor in the whisker-box plot analysis, since it is not affected by extreme values. The median is, as a result, indicated by the vertical line that runs down the center of the box. In figure 4.1 above, the median of the number of the storm before Hurricane Katrina is roughly centered below 4 storms (i.e. 3.5), or it is about a total of 4 storms. This implies that about 50% of the number of storms recorded annually before Hurricane Katrina is less than 4. Additionally, the data is skewed to the right, since most of the observations are concentrated on the low end of the scale.

However, after the incidence of Hurricane Katrina, the figure 4.1 reveals that the median of the number of the storm-- after the Katrina--- is centered exactly on 4 storms. The data is also skewed to the left, since most of the observations are concentrated on the upper end of the scale. This implies that about 50% of the number of storms recorded annually, after Hurricane Katrina, is greater than 4. Given the conditional and empirical probability assumptions, there is a very high probability of Hurricane Katrina causing severe or devastating damage to hurricane-affected areas since after its occurrence has recorded high incidence of storms between 2006 and 2015.

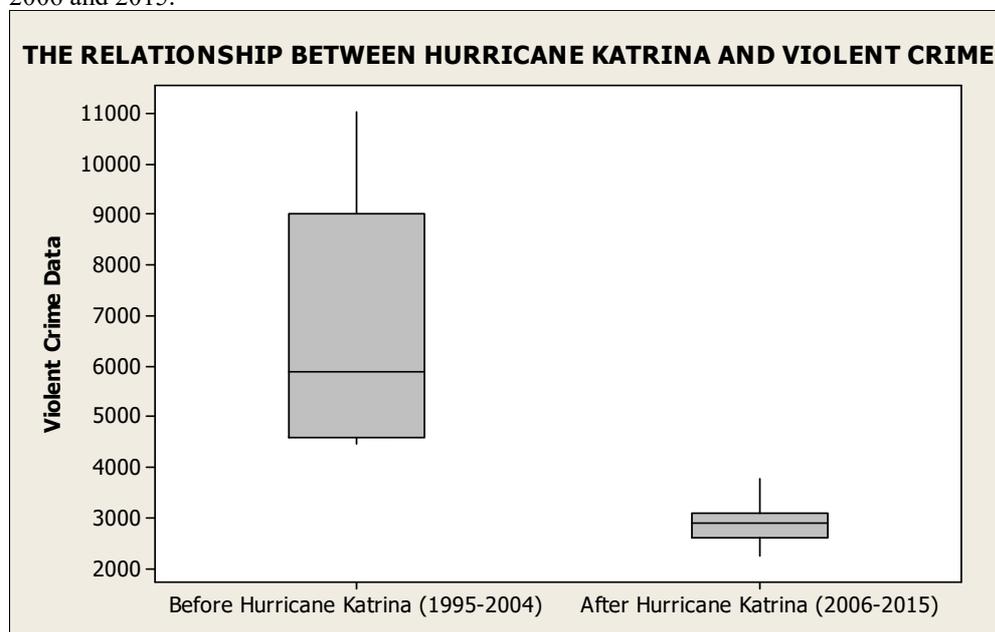


Figure 4. 1A: Association between Hurricane Katrina and Violent Crime Rate
Source: FEMA, 2016; UCR, 2016

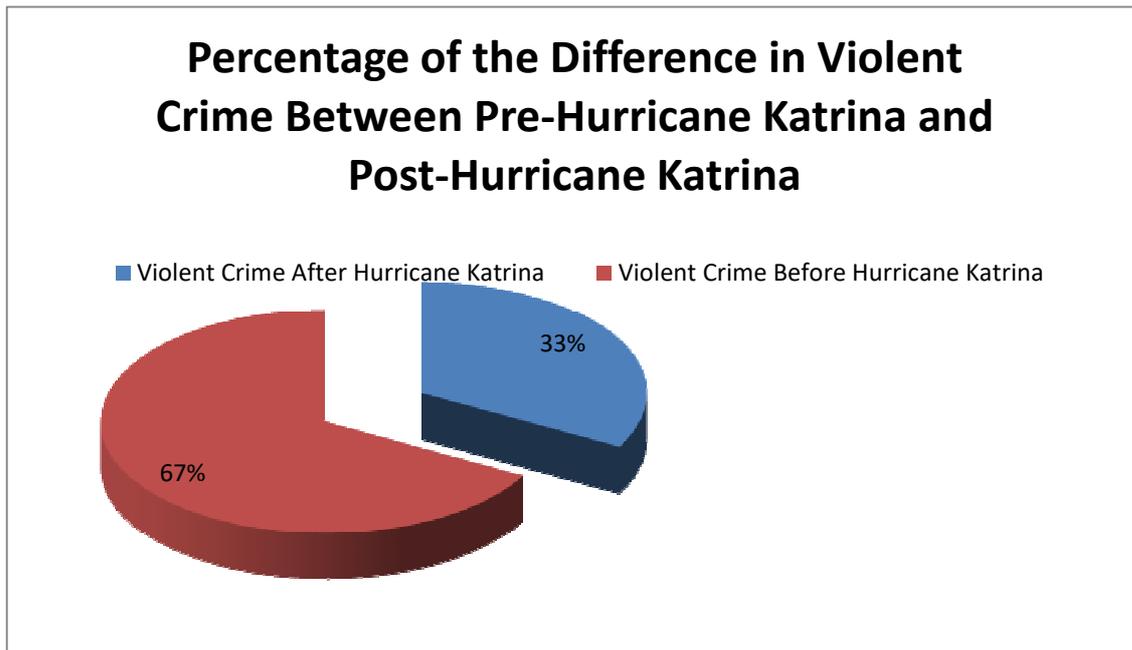


Figure 1B: Percentage Difference in Violent crime Before-and-After Hurricane Katrina
 Source: FEMA, 2016; UCR, 2016

Figure 1A establishes the association between Hurricane Katrina and violent crime in the 1995-2015 periods, while Figure 1B reveals the percentage difference in Violent crime before-and-after Hurricane Katrina. The period before Hurricane Katrina recorded a higher violent crime rate than the post-Hurricane Katrina period. In both figures 1 A & B above, the median of the violent crime cases as well as its associated percentage difference (67%), before Hurricane Katrina, is roughly centered around 5900. This implies that more violent crime is recorded before the incidence or an announcement of Hurricane Katrina. On the other hand, Figures 1A & B have also revealed in the post- Hurricane Katrina period that the violent crime rate has declined to the barest minimum. Taking for example, the median of violent crime, during the post-Katrina period, is centered on 2913. Additionally, the associated percentage difference in violent crime of the post-Katrina (33%) is less than the percentage difference in violent crime of the pre-Katrina (67%). This implies that the relationship between post-Katrina and violent crime is inverse since, after the occurrence of Hurricane Katrina in 2005, violent crime was very low and started to increase in 2006 at a decreasing rate, which was even far below the violent crime cases prior to Hurricane Katrina (1995-2004).

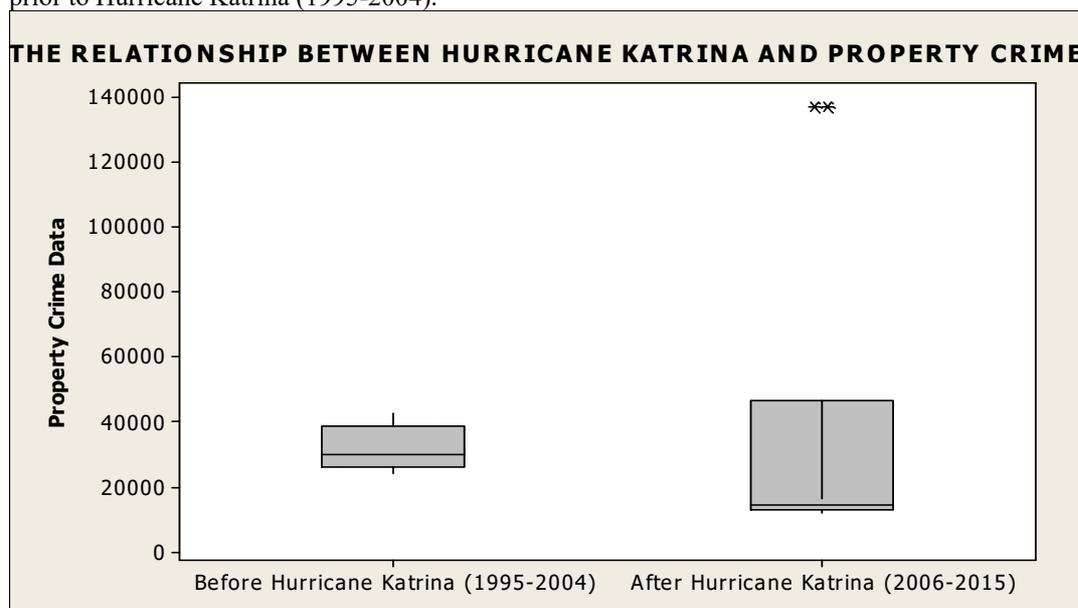


Figure 2A: Association between Hurricane Katrina and Louisiana’s Property Crime Rate
 Source: FEMA, 2016

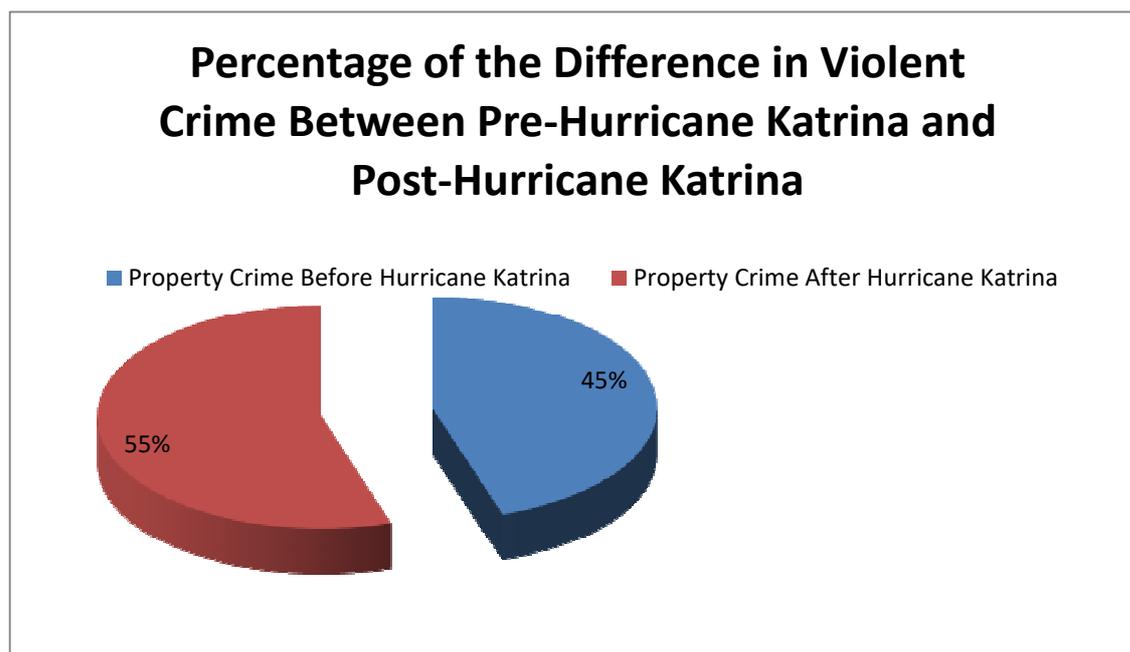


Figure 2B: Percentage Difference in Property crime Before-and-After Hurricane Katrina
Source: FEMA, 2016; UCR, 2016

Figure 2A establishes the association between Hurricane Katrina and the property crime rate between 1995 and 2015, while Figure 2B reveals the percentage difference in property crime before-and-after Hurricane Katrina. The analysis of the crime datasets reveals that the post-Katrina period recorded high rate of property crime than the pre- Hurricane Katrina period (see Figure 2B for more details). Figure 2A above, reveals that the property crime associated with the pre- Hurricane Katrina period is less than 26,106 when taking into account the first-quartile of the box-plot, while within the third quartile analysis of the pre-Hurricane Katrina, the property crime data was revealed to be centered around 38,605, which is less than the third quartile value of the post-Hurricane Katrina property crime value of 46,458. Additionally, the associated percentage difference in property crime of the pre-Katrina (45%) is less than the percentage difference in property crime of the post-Katrina (55%). This implies that about 50% of the property crimes recorded annually, indeed before Hurricane Katrina, is between 26,106 and 38,605. In relation to the FEMA crime data, property crime within the Hurricane Katrina period declined to a zero (0) level in 2005, but it did rise sharply after Hurricane Katrina. In figure 2A above, about 25% of the property crime data is observed to be less than 12,866 property crime cases when considering the first-quartile value of the whisker's box plot, while for the case of the third-quartile, about 25% of the property crime data is also observed to be more than 46,458. This, in fact, implies that about 50% of the property crimes recorded annually before Hurricane Katrina is between 12,866 and 46,458. Above all, the association between the post-Hurricane Katrina and property crime is positive since, after the occurrence of Hurricane Katrina in 2005, property crime has been increasing at a higher rate, which is even far more than or above the property crime cases, which were recorded prior to Hurricane Katrina.

Conclusion and Policy Recommendation

The analysis of the crime data in the midst of Hurricanes from 1995 to 2015 has underscored that there is a high association between Hurricanes (i.e. natural disaster) and crime in general. This may be attributed to insufficient adequate preparedness towards natural disaster. Both Figures 1 and 2 [A&B] have underscored that after Hurricane Katrina, violent crime decreased between 2006 and 2015 at an appreciable level, while property crime was at an increasing rate, which was evidenced by their respective median scores and percentage differences. These findings are, indeed, consistent with a study conducted by Erikson (1994), which underscored that disasters produce anomic conditions, which usually encourage people to be in panic moods. This, on its own, can hinder normative behaviors that are necessary for informal social regulation, leading to an increase in crime. Also, this particular finding is very much consistent with a study by Leitner and Helbich (2011), which was on Hurricane Rita. They argued that Hurricane Rita led to a significant short-term increase in burglaries and auto thefts as well as property crime. Apart of the study conclusion, this particular study recommends that the State should come out with a comprehensive urban design for restoring Louisiana from flood or Hurricane disasters. Such a comprehensive crime defensive urban design must incorporate a workable public policy for the benefit and satisfaction of the people as well as to ensure care for the environment. Also, there is the need to institute a

law and order system that will keep the activities of the city in check and, in the process, to assist the people in case of an emergency, and to provide relevant education for the people so that when they face natural disasters, they may not be a victim of crime perpetrators (see Cozens, 2007 for more details).

REFERENCES

- Bal, T. J., and Torres M. (2006). Disaster realities in the aftermath of Hurricane Katrina: Revisiting the looting myth (UCR Natural Hazards Center Quick Response Report 184). Retrieved from <http://www.colorado.edu/hazards/research/qr/qr184/qr184.html> Google Scholar
- Centers for Disease Control. (1992). Post-Hurricane Andrew Assessment of Health Care Needs and Access to Health Care in Dade County, Florida. *Miami: Florida Department of Health and Rehabilitative Services*. EPI-AID 93-09.
- Charles, B. S. (2015). Disaster Fraud: Criminals Capitalizing on Catastrophes -By October 13, 2015 <https://www.nw3c.org/docs/research/disaster-fraud.pdf?sfvrsn=8><https://mostynperspectives.com/2016/11/28/identity-theft-fraudulent-claims-rise-natural-disasters/>
- Chen, Y.; Syvitski, J.P.M.; Gao, S.; Overem, I.; and Kettner, A.J. (2012). Socio-economic impacts on floodings: A 4000-year history of the Yellow River, China. *Ambio*, Vol. 41. No. 7, pp. 682-698
- Clarke, R.V. (1999). Hot Products: understanding, anticipating and reducing demand for stolen goods. *Police Research Series, Paper 112. Home Office, Policing and Reducing Crime Unit*.
- Cozens, P. (2007). Public Health and the Potential benefits of Crime Prevention through Environmental Design. *New South Wales Public Health Bulletin*, 2007, 1811-12
- Dilley, M., R.S. Chen, U. Deichmann, A.L. Lerner-Lam, M. Arnold, J. Agwe, P. Buys, O. Kjekstad, B. Lyon, and G. Yetman. (2005). Natural Disaster Hotspots: A Global Risk Analysis. Disaster Risk Management, Series No. 5-34423. *Washington DC: The World Bank*.
- Dodman, D., J. Hardoy, and Satterthwaite, D. (2009). Urban Development and Intensive and Extensive Risk. *Mimeo, London: International Institute for Environment and Development (IIED)*.
- Drabek, T.E., Mushkatel A.H., and Kilijanek T.S. (1983). Earthquake mitigation policy: the experience of two states. Program on environment and behavior. *Monograph 31 institute of behavioral science, University of Colorado, Boulder*
- Dynes R. R. and Tierney, K. (Eds.). (1994). Disasters, Collective behavior and Social Organization – Newark, N.J: *University of Delaware Press*.
- Elsner, J.B., Liu, K.B., and Kocher, B.L. (1990). Spatial variations in major U.S. hurricane activity: Statistics and a physical mechanism. *Journal of Climate* 13: 2293-2305.
- Farmer, L. (2008). "Crime, definitions of", in Cane and Conaghan (editors). *The New Oxford Companion to law, Oxford University Press, 2008 (ISBN 978-0-19-929054-3)*, p. 263
- FEMA. (2006). "Frequently Asked Questions". 21 Aug. 2006 Retrieved: 8 Nov. 2006. http://www.fema.gov/plan/prevent/fhm/fq_term.shtm#3
- Frailing, K. (2016). Fraud in the Wake of Disasters. In D. W. Harper and K. Frailing (Eds). *Crime and Criminal Justice in Disaster*, 3rd ed. (pp.191-214). *Durham, NC. Carolina Academic Press*.
- Frailing, K., and Harper, D. W. (2010). Crime and Hurricanes in New Orleans. In D.L. Brunson, D. Overfelt, and J.S. Picou (Eds.), *The Sociology of Katrina: Perspectives on a modern Catastrophe*, 2nd ed. (pp.55-74). *Lanham, MD: Roman and Littlefield*.
- Freiberg, A. (1996). "The Property Crime Market: A Regulatory Approach" (PDF). *Burglary and Car Theft: Is Your Property Safe?, Melbourne, Australia*.
- Gencer, E.A. (2008). Natural disasters, vulnerability, and sustainable development: examining the interplay, global trends, and local practices in Istanbul. *VDM Verlag, Saarbrücken*.
- Leitner, M., and Helbich, M. (2011). The Impact of Hurricanes on Crime in the City of Houston, Texas: *A Spatio-Temporal Analysis*
- Linzholer, S. (2015). Weather in the City: How Design Shapes the Urban Climate. *Nai010 publishers*.
- Oliver-Smith, A. and Hoffman, S. M. (1999). The Angry Earth: Disaster in Anthropological Perspective. *Routledge, New York*. Turner, J. F.C. (1972). "Housing as a Verb." *Freedom to Build*. Ed. Turner. *New York: Macmillan*, p. 148-175.
- The City of New Orleans. (2006). "General Evacuation Guidelines." Retrieved 28 Oct. 2006 <http://www.cityofno.com/Portals/Portal46/portal.aspx?portal=46&tabid=18>
- Uniform Crime Reports. (2007). FBI Uniform Crime Reports: Crime in the United States, City of New Orleans. Retrieved from <http://www2.fbi.gov/ucr/cius2007/index.html>
- United Nations International Office for Disaster Risk Reduction (UNISDR) (2009). Risk and Poverty in a Changing Climate: Invest Today for a Safer Tomorrow. *Global Assessment Report on Disaster Risk Reduction*. Geneva, Switzerland: UNISDR.

- United Nations International Office for Disaster Risk Reduction (UNISDR) (2010). *Local Governments and Disaster Risk Reduction: Good Practices and Lessons Learned*. Geneva, Switzerland: UNISDR.
- United Nations International Office for Disaster Risk Reduction (UNISDR) (2011). *Revealing Risk, Redefining Development. Global Assessment Report on Disaster Risk Reduction*. Geneva, Switzerland: UNISDR.
- United Nations International Office for Disaster Risk Reduction (UNISDR) (2015). *Making Development Sustainable: The Future of Disaster Risk Management. Global Assessment Report on Disaster Risk Reduction*. Geneva, Switzerland: UNISDR.
<http://www.preventionweb.net/english/hyogo/gar/2015/en/home/index.html>.
- United Way of Santa Cruz County. (1990). *A Post-Earthquake Community Needs Assessment for Santa Cruz County. Aptos, California: United Way of Santa Cruz County: 201*.
- Voigt, L., and Thornton, W. E. (2015). Disaster-related human rights violations and corruption: A 10-year review of post-Hurricane Katrina New Orleans. *American Behavioral Scientist*, 59(10), 1292-1313.
- Zahnow, R. (2015). Tides of Change? The effect of flood on neighborhood property crime trends. In: *Australian and New Zealand Disaster and Emergency Management Conference*, Gold Coast Convention Centre, Gold Coast.
- Zahran S., Shelly T. O., Peek L., Brody S. D. (2009). Natural disaster and social order: Modeling crime outcomes in Florida. *International Journal of Mass Emergencies and Disasters*, 27, 26-52.
- Zhou, D. (1997). "Disaster, Disorganization, and Crime." Ph.D Dissertation. Department of Sociology, University at Albany, State University of New York. *Ann Arbor, Michigan: University Microfilms International*.